THE MINERAL INDUSTRY OF

GUINEA

By Philip M. Mobbs

Guinea was the world's second largest bauxite producer and had the world's largest bauxite resources (Plunkert, 1998). In 1997, mining accounted for about 16% of the nation's estimated \$3.9 billion gross domestic product, 89% of Government revenue, and more than 80% of Guinea's exports. The limited domestic demand for crude minerals resulted in the mineral sector effectively dominating the nation's exports. In 1997, the country's total exports were valued at \$770 million compared with \$696 million in 1996 (U.S. Department of State, June 1998, Country commercial guide, accessed on November 9, 1998, at URL http://www.eti-bull.net/USEMBASSY/cc99h.htm). In 1996, the latest year for which data are available, bauxite accounted for 45% of value of national exports; gold. 15%; alumina, 14%; and diamond, 7%.

Guinea supplied 39% of the United States' metallurgical-grade bauxite imports in 1997. Less than 10% of mined bauxite was used to produce alumina in Guinea.

The Government encouraged infrastructure development and promoted mineral industry expansion. The Mining Code of 1995 defined incentives, mineral ownership, mining fees, mining titles, royalties, and other taxes. The Government reserved 15% free equity in gold and gem operations. State participation in bauxite-and iron-ore-mining ventures was subject to negotiation. Mineral beneficiation in Guinea was encouraged. Under the new law, the royalties were 5% on alumina and 3.5% on concentrates compared with 10% on bauxite and 7% on other ores. The corporate income tax rate was 35%.

In addition to possessing significant bauxite reserves, Guinea had diamond, gold, granite, and iron deposits. The Government encouraged the expansion of the bauxite sector and promoted the diversification of the mineral industry, indicating that chromium, cobalt, graphite, limestone, manganese, nickel, tin, and uranium resources also existed in the country but need additional investigation (Ministère des Mines et de la Géologie, 1995).

The Government initiated a mineral industry privatization program. In November, the investment bank SBC Warburg Dillon Read was appointed to advise the Government on the possibility of restructuring the bauxite industry, which was dominated by three companies. The almost 14-million-metric-ton-per-year (Mt/yr)-capacity Compagnie des Bauxites de Guinée (CBG) operated a number of open-pit bauxite mines in the Boké District, including the Sangarédi Mine. Halco Mining Inc. (51%) and the Government (49%) controlled CBG. The state-owned Société des Bauxites de Kindia (SBK) was restoring production to the operation's nominal 3-Mt/yr capacity. SBK's production was exported to the Ukraine. In December, SBC Warburg Dillon

Read was asked to intercede in the dispute between the Government and the Frialco Holding Co. concerning the Société d'Economie Mixte Friguia. Friguia, owned by the Frialco Holding Co. (51%) and the Government (49%), operated the Fria bauxite mine and the Kimbo alumina refinery. Halco and Frialco were consortia of international aluminum companies.

The dissension between the Government of Guinea and Frialco escalated in April 1997 after a failure to renew the Friguia management contract. The Government subsequently declared Friguia bankrupt. Because the State wanted more value-added alumina production rather than raw bauxite exports, it claimed that the Frialco consortium was not making adequate investments in the alumina sector and that the integration of Friguia's alumina production with the Frialco partner's international interests limited the plant's incentives and local accountability. Frialco reportedly was concerned that Friguia had been losing money in recent years, that the Government's social agenda conflicted with efficient plant management, and that the State's 1995 agreement to privatize the company had not been carried out. Frialco filed for arbitration (Financial Times, 1997; Metal Bulletin, 1997; Mining Journal, 1998a).

At yearend, Union Mining NL of Australia obtained a reconnaissance licence for the Gaoual bauxite deposits in northwestern Guinea. Previous exploration work had indicated the presence of nine bauxite deposits in the concession area. The company suggested that bauxite resources were 1.16 billion metric tons at an average grade of 52.7% Al₂O₃ (Union Mining NL, 1998, Quarterly report—For the period ended 31 March 1998, accessed July 9, 1998, at URL http://www.unionmining.com.au/ March98quarter.html). The Government was encouraging development of the Dabola and the Dian-Dian projects. Itok Guinea, a subsidiary of Iran Itok Engineering and Technological Co. of Iran, was evaluating the feasibility of a 600,000-metric-tonper-year bauxite mining operation and a 1.2-Mt/yr alumina refinery at Dabola. The Dian-Dian proposal included a 11-Mt/yr bauxite mine and an aluminum smelter.

In southeast Guinea, the Nimba Mountain iron ore project of Nimba International Mining Co. (NIMCO) was again being restructured. NIMCO was evaluating options for transporting ore to ports on the Atlantic Coast. To the north of the Nimba Mountains, Rio Tinto plc of the United Kingdom began exploration of the banded-iron deposits in the Simandou Range.

Artisanal operators were significant gold producers, accounting for about 80% of the national gold output (European Union, 1998, Mines '98—Guinea, accessed August 25, 1998, at URL http://www.landscape.de/mines98/country/gn/index.htm). Société Minière de Dinguiraye (SMD) operated the open pit Léro gold mine. SMD was owned by the Government (15%) and Delta

¹Where necessary, values have been converted from Guinean francs (GnF) to U.S. dollars at the average exchange rate of GnF1,077=US\$1.00.

Gold Mining (85%), a Jersey registered corporation of the United Kingdom. Delta, in turn, was owned by Kenor ASA of Norway and Mine Or S.A., the gold operations subsidiary of La Source Group of France. The mine produced 1,502 kilograms (kg) of gold in 1997 compared with 1,207 kg in 1996 (Kenor ASA, Projects, accessed October 28, 1998, at URL http://www. kenor.no/projects/ope_ler.html). Results of exploration in 1997 on the concession allowed SMD to increase the Léro deposit resources by 1.258 Mt grading 3.73 grams per ton (g/t) of gold in 1997. Kenor announced resources of 13 Mt grading 1.52 g/t of gold with a cut-off grade of 0.5 g/t based on a feasibility study of the Fayalala deposit on the Dinguiraye concession, 6 kilometers (km) east of the Léro Mine (Kenor ASA, Projects, accessed October 28, 1998, at URL http://www.kenor.no/projects/dev_fay. html) and was drilling on the Tambico prospect, 2 km northwest of Favalala.

The \$55.7 million Siguri gold prospect was scheduled to start gold production in 1998. At yearend, the Siguri project was owned by the Ashanti Goldfields Co. Ltd. of Ghana (85%) and the Guinean Government (15%). Ashanti had acquired the 15% equity interest formerly held by the International Finance Corp. of the United States. During 1997, the mining contractor, Moolman Brothers of South Africa, mined more than 330,000 metric tons (t) of ore at Siguri. Ores from the Korangbe and the Sanu Tinti pits were crushed, blended, and stacked for heap leaching. The heap leach was designed to handle 4 Mt/yr. Resources at Siguri were estimated to be 67 Mt at an average grade of 1.6 g/t of gold (Mining Journal, 1998b). In addition to construction of the mine and plant, the company upgraded 200 km of road, built a 5.5-megawatt (MW) diesel-fueled electrical generating plant, secured a process water supply for the plant, and developed a potable water supply for the local community.

At the beginning of 1997, Les Minéraux SGV S.A., a subsidiary of Braz-Ouro Resources Inc. of Canada, was exploring the Jean and the Gobele deposits. Resources were estimated by the company to be 2.27 Mt grading 3.07 g/t of gold for the Gobele vein with a cut-off grade of 0.5 g/t and 452,000 t grading 6.17 g/t of gold for the Jean vein (Emerging Africa Gold (EAG) Inc., August 19, 1997, Resource estimates on Jean/Gobele—Guinea, Email from portfolio@newswire.ca). Minéraux SGV also was exploring a Simandou area gold prospect. Braz-Ouro was a joint venture of Semafo Inc. of Canada, formerly West Africa Mining Exploration Corporation Inc., and Emerging Africa Gold (EAG) Inc., an affiliated company of St. Geneviève Resources Ltd. In October, Semafo bought EAG's 50% interest in Braz-Ouro. Semafo subsequently dissolved Braz-Ouro and transferred the ownership of Minéraux SGV to Semafo (Barbados) Ltd.

African Selection Mining Corp. of Canada was exploring for gold on the EcoGuinee license in northwestern Guinea while its partner in the joint venture, Eco-Guinea/GUAM S.A.R.L. of Guinea, was working placer deposits on the concession. Africa Selection Mining also held the Labe gold concession. The joint venture of Ashanti and AGEM Ltd., a subsidiary of IAMGOLD Ltd. of Canada, was exploring on the Mandiana and the Kodieran gold concessions. Chalice Mining Inc. of Canada was exploring the Heremakino property after buying out former partner Patrician Gold Mines Ltd. of Canada. EAG explored for gold on the Balandougouba permit and on the Yro-Iran concession before

disposing of the properties at yearend as part of the St. Geneviève Resources Group's restructuring and divestment of operations (St. Geneviève Resources Ltd., November 27, 1997, St. Genevieve Resources Ltd. update, accessed December 1, 1997, at URL http://www.newswire.ca/releases/November1997/27/c6868.html). Goldex AS, a wholly owned subsidiary of Kenor, was exploring on the Farabana exploration permit. Golden Limbo Rock Resources S.A., a subsidiary of Mano River Resources Inc. of Switzerland, prospected on the Missimana and the Gueliban gold properties. Pacific Galleon Mining Corp. of Canada was exploring the Bananfara concession. Prospex Mining Inc. of Canada, formerly Akiko Gold Resources Ltd., acquired interest in the Kindia and the Beyla gold concessions from Nearco Jersey (Nominees) Ltd. Reunion Mining plc of the United Kingdom and First Quantum Minerals Ltd. of Canada were evaluating the Nyantanina gold permit.

SAGEM S.A. of Guinea and New Sage Resources Ltd., the Canadian subsidiary of Striker Resources NL of Australia, were exploring the Sankarani gold deposit. Société Minière de Kérouané, a venture of Lithos Corp. of Canada and local partners, was exploring for gold on the Apredor concession. Stirling Management Ltd., a subsidiary of Consolidated African Mining Corp. of the United Kingdom, was exploring on the Kankan South and the Tinkisso South prospects. Prospecting on the Kossaken gold concession was Wells Gold Corp. NL of Australia. Also exploring for gold were Anglo-American Corp. of South Africa, Explorations Minières du Nord Ltd. of Canada, Placer Dome Inc. of Canada, and Semafo Guinée S.A., a subsidiary of Semafo (Barbados) Ltd.

Minéraux SGV was exploring the Kaloum/Mount Kakoulima nickel prospect with AFCAN Mining Corp. of Canada, formerly the Société d'Exploration Pétrolière et Minière Inc.

Increased demand for construction materials contributed to the Government's lifting its restriction on cement imports. Cement imports increased to 65,253 t in 1997 compared with 19,000 t in 1996. Cement clinker imports also increased in 1997.

Nationwide, 70% to 80% of diamond production was of gem quality. More than 80% of production was from indigenous artisanal operations. Aredor FCMC S.A., a venture of First City Mining Co. Ltd. (59.5%), Consolidated African Mining Ltd. of South Africa (25.5%), and the Government of Guinea (15%), produced 14,106 stones weighing 17,014 carats from the Aredor concession in 1997. Aredor FCMC was constructing a 100-metric-ton-per-hour (t/hr) washing plant on its diamond concession to replace the existing test plant. Trivalence Mining Corp. of Canada, the owner of First City Mining, estimated that the Aredor concession's diamond reserves were 1.3 million carats (Northern Miner, 1998). Aredor FCMC also installed a 60-t/hr wash plant to reprocess the more than 10 Mt of tailings generated by the Aredor Mine which had closed in 1994. Aredor FCMC began exploration of the kimberlites on the concession.

Hymex Diamond Corp. of Canada, through its subsidiary, Hymex Guineé S.A., recovered 43,665 stones weighing 24,022 carats from alluvial diamond operations on its Kerouane region concession. On the Diani permit, Hymex installed a 150-cubic-meter-per-hour capacity wash plant. Hymex also proceeded to install a 10,000-cubic-meter-per-month crushing plant at the Droubja kimberlite pipe. Although the acquisition of a majority

interest in the adjacent Milo diamond mining concession of International Mining Co. S.A. of Guinea (IMC) by Hymex was challenged by Northern Abitibi Mining Corp. of Canada, which had a preexisting agreement with IMC, it was successfully concluded prior to yearend.

Alpha Diamond Corp. of Canada and Gold Rivers of Africa Corp. were using a small dredge on a diamond and gold concession on the Konkoure River. De Beers Consolidated Mines Ltd. of South Africa began kimberlite exploration in southeastern Guinea. Jupiter Mining Corp. attempted to sell its two diamond exploration concessions. Failure of the negotiations was attributed to decreased availability of financing for junior mining companies (Global Explorations Corp., January 30, 1998, Form 61 (BC), accessed November 6, 1998, at URL www.sedar.com/dynamic pages/assoc docs e/d00007557.htm). Spider Resources Inc. of Canada, an affiliated company of St. Geneviève Resources Ltd., acquired the rights of its sister company, EAG, to the Apredor diamond permit. Spider also acquired a diamond exploration concession north of Apredor held by Bassad Guinea S.A. Spider released both exploration permits by yearend.

U.S. Oil Corp. of the United States was evaluating the petroleum potential of offshore Guinea.

Total bauxite reserves were estimated at about 20 billion metric tons grading more than 40% aluminum oxide, according to the Ministry of Natural Resources and Energy. Iron resources were estimated to be about 6 billion metric tons grading 64% to 68% iron, and gold reserves were estimated to be between 200 and 1,000 t of contained gold. The Government also estimated there were reserves of 20 million carats of diamond in Guinea (Ministère des Resources Naturelles et de l'Energie, 1997).

Major highways have been paved, but the rural transportation infrastructure was inadequate to meet demand. Guinea had two main ports—Conakry and Kamsar. Conakry, the country's main general cargo port, was linked to the Kinda Mine by a 104-km standard-gauge railroad line and to the Fria Mine by a 145-km, 1-meter (m)-gauge railway. Kamsar, which handled only bauxite shipments, was linked to the Sangarédi Mine by a 135-km standard-gauge railroad line. In addition to the mine railroads, a 661-km 1-m-gauge line connected Conakry with Kankan. The Conakry-Dabola segment of the Conakry-Kankan line was being rehabilitated as part of a \$200 million project by Slovak Railways.

Guinea had a nominal installed electricity generating capacity of about 186 MW, of which 134 MW originally could be generated by thermal plants burning imported petroleum fuels and 52 MW was attributed to the Banéa, the Donkéa, the Kinkon, and the Tinkisso hydroelectric powerplants. Many thermal plants and the generators at the Kinkon and the Tinkisso dams operated intermittently, resulting in a tangible generating capacity of about 100 MW in 1997 (Guinéenews, June 1998, Espoirs energétiques en Guinée, accessed November 9, 1998, at URL http://www.myna.com/~boubah/GUINEE/ARCHIVES/9806.htm). Mining companies accounted for about 50% of the thermal power production.

An 11-MW addition to the Tombo thermal plant was nearly

complete, and the \$237.7-million, 75-MW Garafiri hydroelectric plant was expected to be generating electricity in 1999. Guinea's hydroelectric-power-generating-capacity potential exceeded 6,000 MW. Proposed hydroelectric plants included the 60-MW plant at Kaleta, a plant at Fomi, and the resumption of work on the 750-MW Souapiti project on the Konkoure River. Up to 300 MW of electric power from the Souapiti plant was projected to be dedicated to the proposed Dian-Dian aluminum smelter.

Although the 1995 mining code significantly improved the business climate for the mineral industry, mineral operations remained hampered by infrastructural constraints. International funding of mineral deposit development was proceeding more slowly than anticipated. The less-than-expected foreign investment was attributed to the country's perceived political and economic risks, and decreased availability of financing for junior mining companies, as well as civil disturbances in adjacent Guinea-Bissau, Liberia, Senegal, and Sierra Leone.

Alumina, bauxite, and gold are expected to continue dominating Guinea's economy. The addition of the CBG's Bidikoum Mine should help maintain the high quality of the nation's bauxite exports, and advanced-stage gold-exploration projects enhance the potential input of gold doré into the economy. Ventures requiring significant electric power availability, such as an aluminum smelter, could become feasible as the nation's power-generation capacity is increased.

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Major Source of Information

Ministère des Resources Naturelles et de l'Energie Centre de Promotion et du Development Minier P.O. Box 295

Conakry, Republic of Guinea Telephone: (224) 41-15-44 Fax: (224) 41-49-13

Major Publication

Morgan, George A., Izon, David, and Sow, Nene Ousmane, 1992, Mineral economy of Guinea: U.S. Bureau of Mines Mineral Perspectives, 24 p.

TABLE 1 GUINEA: PRODUCTION OF MINERAL COMMODITIES 1/

(Thousand metric tons unless otherwise specified)

Commodity		1993	1994	1995	1996	1997 e/
Alumina:						
Production:						
Hydrate		642	648	630	650	527
Calcined		656	640	616	640	520
Shipments, calcined		656	545	616	619	500
Bauxite:						
Mine production:						
Wet basis 2/		17,100	14,900	18,000	18,700	19,250
Dry basis 3/		15,300	13,300	15,800	16,500	17,100
Calcined		80	89	244	95	100
Shipments (dry basis):						
Metallurgical		13,617	11,033	12,304	13,000 r/e/	14,500
Calcined		79	91	89	95	95
Diamond 4/5/	thousand carats	167	381	365	205	205
Gold 5/	kilograms	3,864	5,617	7,863	6,838	7,000

e/ Estimated. r/ Revised.

^{1/} In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone) presumably are produced, but output is not reported. An estimated 270,000 tons of cement was produced in 1997 from imported clinker. Table includes data available through November 13, 1998.

^{2/} Metallurgical plus calcinable ore estimated to be 13% water.

^{3/} Data are for wet-basis ore estimated to be 13% water, reduced to dry basis estimated to be 3% water.

 $^{4/\}operatorname{Production}$ is approximately 70% to 80% gem quality.

^{5/} Figures include artisanal production.